

**tee on Foreign Relations
the United States and the
Agency on the Application
ed States: Resolution of
27, 1980¹**

esent concurring therein), That the
on of the Agreement between the
rnational Atomic Energy Agency
e United States of America, with
on November 18, 1977 (Ex. B,
n, hereinafter referred to as "the
ng understandings:

the Committee on Foreign Rela-
e on Foreign Affairs of the House
ddition to the list, to be provided
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the determination was made that
national security significance, not
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that concerned licensees within
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ip of the Department of State, for
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urther, that the Congress shall be
l procedures of such interagency

3. -International Atomic Energy Agency Safe-
pt. 96-42, p. 9.
-775.

4. That in the event of any question of interpretation of the Agreement, the Nuclear Regulatory Commission shall seek and be bound by guidance from the President. Neither this understanding nor any other in this resolution shall in any way alter the responsibilities of the Nuclear Regulatory Commission under the Agreement or in any way limit the existing authorities and responsibilities of the Nuclear Regulatory Commission.

5. That the Agreement shall not be construed to require the communication to the International Atomic Energy Agency of "Restricted Data" controlled by the provisions of the Atomic Energy Act of 1954, as amended, including data concerning the design, manufacture, or utilization of atomic weapons.

**French Working Paper Submitted to the Committee on
Disarmament: Control of the Non-Manufacture and
Non-Possession of Agents and Weapons of Chemical
Warfare, June 27, 1980¹**

Many countries, including France, rightly consider that it would be more dangerous for the security of the countries affected to prohibit the manufacture and possession of chemical agents and weapons without providing means of verifying the strict application of the prohibition than to have no agreement whatsoever.

The prohibition of manufacture should be adapted to the category of chemical warfare agents covered: for single-purpose (super-toxic and incapacitating) agents, the prohibition would be total, while for dual-purpose agents and irritants, the manufacture only of amounts required to meet civilian needs would be authorized.

Control of non-manufacture would therefore cover exclusively the first category; in the case of dual-purpose agents, control would be confined to ensuring that the amounts produced do not exceed a certain level determined by the volume of civilian manufacture and, where they do, to checking that the surpluses are not used in chemical munitions or devices.

SINGLE-PURPOSE CHEMICAL WARFARE AGENTS

1. Control and verification

Single-purpose agents obviously comprise the class of super-toxic substances and, within this class, the category of organophosphorus compounds, over which the greatest vigilance should be exercised.

Non-manufacture should be monitored at two levels:

By ascertaining that manufacturing plants specializing in the produc-

¹ CD/106.

tion of organophosphorus nerve agents have indeed been closed down or converted and have consequently ceased all military activity;

By ensuring that plants producing related compounds (pesticides) are not improperly converted into factories for the manufacture of nerve agents; such conversion would be possible in a few months.

The first step, without which all control would become difficult if not completely ineffective, would be the registration by countries possessing them of all installations producing or having produced organophosphorus nerve agents.

Presuming that this requirement is correctly applied, effective control can only be exercised through on-site inspection, whether periodic and unannounced, on request or on the complaint of a member country or international organization. There is no other method of ensuring for certain that a country which has committed itself to an agreement prohibiting manufacture is not violating the provisions of that agreement. Such on-site inspection must be thorough if it is to be effective; it is therefore not discreet, and some countries may be reluctant to accept it, fearing that it might involve a disclosure of military, industrial or trade secrets. In the case of super-toxic substances, this fear does not appear justified because, by definition, they are intended only for military purposes and, in the spirit of the agreement itself, there can be no military or industrial secrets in this area.

Because of the doubts to which the idea of thorough on-site inspections have given rise, efforts have been made in the Conference of the Committee on Disarmament to find methods which could be applied in both the above cases and would necessitate the presence of an observer or controller, not in the plant itself, but merely in the neighbourhood. These methods will be considered below for each of the two cases.

The suggestion that there should be remote sensing of indications of clandestine manufacture of nerve agents, eliminating even the need to enter the national territory of the country under inspection, however, goes much further. The suggested methods include:

Processing of statistical data provided by member countries;

Remote detection of chemical agents in gaseous effluents using ultra-sensitive detectors mounted on satellites or based on land outside the territory of the country being monitored.

All these methods have the same serious disadvantage: they are rather unreliable and the absence of any positive indications of clandestine manufacture does not ensure beyond doubt that there has been no violation of the terms of the agreement. It has, however, been suggested that the lack of reliability could, to some extent, be offset by using several of these methods, and that the mere fact of their announced application could play a dissuasive role and make any attempt to circumvent the terms of the agreement excessively complicated. Even if this was so, the installation of such a system would be too cumbersome and would not yield results that were certain.

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2. Analysis of statistical data

It has been felt that the analysis of existing statistical data on the production, importation, exportation and use of raw materials and products involved in the manufacture of chemical warfare agents could reveal any undue change in the volume of products consumed that could imply clandestine manufacture of chemical agents.

This process would be applicable primarily to organophosphorus nerve agents, among which it has been suggested that the following products should be monitored: phosphorus; phosphorus trichloride; phosphorus pentachloride; phosphorus oxychloride; phosphorus pentasulphide; phosphites of dimethyl, trimethyl, diethyl and triethyl; pinacolic alcohol; dichloride and difluoride of methyl-phosphonic acid. All these products, except perhaps the last two, have industrial applications.

However, statistical data at present published on these products are usually very incomplete; the content and presentation vary in different countries. If they are to be utilized, therefore, they should be submitted in the same form by all countries and supplemented in order to cover all products selected as indicative.

This method should not give rise to exaggerated expectations, since:

There are considerable annual fluctuations in the statistics in question for reasons that have nothing to do with the production of chemical agents; these variations could lead to unjustified suspicion;

By contrast, in a highly industrialized country producing pesticides and consuming large amounts of raw materials, a small withdrawal of about 1 per cent, which would initially be imperceptible, could be used to manufacture hundreds of tonnes of nerve agents every year.

In this area, too, a great deal of technical work will have to be done before the method can be used with any chance of success. This work should be entrusted to a group of experts, the main task of which would be to harmonize data collection in member countries. In this sphere of statistical data collection and utilization, it could also study the legislation in force in each country and the possibilities of using United Nations studies on certain related subjects (environment, drugs, etc.).

3. Remote sensing

It has been suggested that it might be possible to detect the presence of super-toxic substances or intermediate products in gaseous effluents from a factory under suspicion from very great distances. Some² consider that highly sensitive detectors, either mounted on satellites in geostationary orbit or based on earth outside the countries being monitored, would be able to detect concentrations of 10^{-1} mg/m³ with a probability of 0.3 in winter and 0.75 in summer. Others³ believe that

² CCD/371 and CCD/502. CCD/371 may be found in *Documents on Disarmament*, 1972, pp. 408-417.

³ *Ibid.*, 1977, pp. 470-475 (CCD/502).

even greater sensitivity is obtainable with monolithic impure crystal detectors at the ultra-low temperatures found in outer space or by using the induced and resonance combination scattering (Shorygin) effect.

Identification of the substance could be based on the infra-red and Raman spectra.

Although they are possible in theory, no experimental verification of these methods has yet been attempted and it may be doubted whether they are applicable in the near future, given the present level of technology in this sphere.⁴

4. *Closure and surveillance of existing manufacturing plant*

In addition to the dissemination by each member country of a list of factories which have manufactured chemical warfare agents (including super-toxic substances) and were scheduled for closure or conversion under the agreement, the agreement should lay down the procedure for ensuring that they have not recommenced operation.

It has been seen that only periodic and thorough on-site inspections could indicate with certainty that no illicit activity has been carried on in a factory that has been shut down. However, in order to avoid permanent, burdensome and encumbering surveillance, a method has been suggested which would not necessitate the continuous presence of observers or inspectors. It would consist in affixing virtually unbreakable sealing devices to the apertures and certain central components of the manufacturing equipment (controls, valves, etc.). In this way, valves could be enclosed in aluminized-glass cases with a number of channels incorporating optical-fibre cables. Since each of these cables has its own imprint, any attempt to use the valves would be easy to detect. The aluminization of the glass would enable any attempt to pierce a hole in the casing to be detected.

Other methods for detecting the fraudulent use of a factory that has been shut down—seismic detectors, thermal detectors, closed-circuit television systems—have been recommended, although their efficiency has not been verified.

All these measures require the presence on site, at least periodically, of inspectors.

5. *Monitoring of plants manufacturing organophosphorous compounds and new plants*

There should also be monitoring of plants manufacturing organophosphorus compound pesticides and of new plants which could, through certain changes in equipment, produce organophosphorus nerve agents. Thorough on-site inspection could involve the disclosure of industrial secrets in these cases.

Efforts have therefore been made to find methods of detecting whether a particular installation is manufacturing nerve agents with-

⁴ CCD/360. See *Documents on Disarmament*, 1972, pp. 98-109.

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out necessitating the indiscreet presence of inspectors in the factory
itself.

The first method consists in reducing inspection to a brief and
superficial visit aimed merely at evaluating the safety measures adopted,
the scope of which can reveal whether chemical agents are being
manufactured. The second is based on examination of the effluents
leaving the plant.

(a) *Brief inspections*

The sole purpose of such inspections, which would not go into
production details, would be to detect signs of the unauthorized
production of chemical warfare agents; particular attention would be
paid to the nature and extent of the safety measures applied.

Buildings in which highly toxic products are manufactured are
generally designed in such a way that production or processing units
are airtight and are kept at less than atmospheric pressure in order to
prevent any leaks. Since certain intermediates in nerve-agent produc-
tion are pyrophoric, the presence of an inert gas in the vessels
containing them could be detected; similarly, pipes could be equipped
with an inert-gas rapid-purge system. As there are no leakproof
pumps, liquids are often made to flow by gravity. In production areas,
there will be an evident increase in remote controls and monitoring
and alarm devices (cages of test animals, alarm detectors).

The staff will be equipped with masks and often dressed in special
impermeable clothing. "Hot" spaces will be entered by locks fitted
with sprinklers. Installations will be equipped with automatic sam-
pling devices.

The factory itself will have its own plant for emergency air and
power supply.

Finally, although medical supervision is the norm in many facilities
producing organophosphorus pesticides, its nature and extent (frequency
of blood cholinesterase doses, resuscitation, presence of specific antidotes)
might constitute indicators.

One should not, however, entertain any illusions concerning the
usefulness of such a brief inspection by itself; it can only serve as a
complement enabling other indicators collected elsewhere to be confirmed.
First of all, assessments of the level of safety needed vary from country
to country. Moreover, safety measures of similar type are often applied
during the final phase in the production of certain toxic pesticides in
order to guard against the danger of a substantial quantity of the
substance being accidentally discharged.

(b) *Effluent analysis*

This method is based on the fact that, in the manufacture of
organophosphorus compounds, some of the products used in the final
phase of the manufacturing process and the end-product itself are to be
found in very low concentrations in liquid effluents and the surround-
ing atmosphere; even if these products have undergone some degrada-
tion during effluent treatment, the controlled hydrolysis of super-toxic
organophosphorus compounds invariably produces methylphosphonic

acid, which is readily identifiable by its phosphorus-methyl group: with a few exceptions, organophosphorus pesticides yield phosphoric acid in the same conditions.

When concentrated, samples of such effluents and of the air in the immediate vicinity of the suspected factory would enable the products concerned to be identified and analysed. There are various methods which can theoretically be applied for such analysis: gas chromatography, thin-layer chromatography, infrared spectrometry, emission spectrography, mass spectrometry, magnetic-resonance molecular spectrometry, paramagnetic electronic resonance, colorimetry and enzyme analysis.

These methods, which have proved themselves in the laboratory, have never been tried in the practical conditions of a check requiring a simple, rapid, accurate and practicable procedure with easily transportable and inexpensive equipment. Among the physical methods, gas chromatography, which is in common use, is the most readily applicable in the present circumstances: a chromatograph coupled with a thermionic flame detector would permit detection to 1×10^{-13} g. However, this method would need further refinement to be applied to effluents discharged into a watercourse, for experience has shown that some watercourses (for example, the Rhine) are normally polluted by interfering products which are detrimental to measurement reliability.⁵

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DUAL-PURPOSE CHEMICAL WARFARE AGENTS

In the case of dual-purpose agents and precursors, the only available monitoring method is statistical data analysis aimed at detecting the manufacture of possible surpluses above civilian requirements.

Such monitoring can be done only at the level of the filling of munitions and devices, since it is not possible to prove that surplus stocks of such products are not intended for civilian purposes. Efforts should therefore be concentrated on the detection of filling facilities; such detection will doubtless be even more difficult than in the case of single-purpose chemical warfare agents.

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PROHIBITION OF PRODUCTION IN THE VARIOUS DRAFT CONVENTIONS

PROBLEM OF VERIFICATION

1. *Prohibition of development, production and stockpiling*

Three draft conventions have been submitted to CCD. The prohibition of the development and production of chemical warfare agents is dealt with in the following articles of the various drafts:

Draft of the socialist countries: ⁶ articles IV and V;

⁵ CCD/533.

⁶ See *Documents on Disarmament*, 1972, pp. 120-124.

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WARFARE AGENTS

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Draft of Japan: ⁷ articles V and VI;

Draft of the United Kingdom: ⁸ articles III, V, VIII and IX.

The drafts of the socialist countries (article IV), Japan (article V) and the United Kingdom (article V) formulate in more or less the same terms the scope of the prohibition of the development, production or retention (stockpiling in the United Kingdom text) of agents, weapons (munitions in the United Kingdom text), equipment and means of delivery (systems in the United Kingdom text).

Article III of the United Kingdom proposal is far more precise regarding the scope of the prohibition. It embodies an undertaking:

To close down, dismantle or convert any factories producing chemical warfare agents;

Not to convert any existing factories or establish any new factories for the production of chemical warfare agents;

To close down, dismantle or convert filling facilities.

Article V of the socialist countries' draft merely stipulates that any problems which might arise shall be solved by consultation and co-operation between the States Parties, possibly through international procedures (unspecified).

The drafts of Japan and the United Kingdom are more comprehensive and make express provision for the procedures to be applied.

The Japanese draft calls for national verification organs which would supervise the national activities related to the subject matter of the Convention, report to an International Verification Agency, provide it with the necessary statistical data and co-operate with it.

The International Verification Agency would analyse and evaluate periodic reports and information from the national organs, request explanations and, if appropriate, send observers, participate in inquiries or inspections and, lastly, carry out decisions.

The United Kingdom draft provides for a Consultative Committee with functions similar to those of the International Verification Agency:

Analysis and evaluation of periodic reports and statistical and other information;

Requesting of information and conduct of inquiries and inspections;
Co-operation with the national organizations.

On the other hand, article IX of the United Kingdom draft gives a detailed description of the obligations of States Parties in this regard:

Acceptance of inspection within six months of the entry into force of the Convention, of any factory formerly producing chemical warfare agents, and taking of samples;

Acceptance of sealing and periodic inspection of factories formerly producing chemical agents and munitions;

Acceptance of a number of inspections of specified factories.

⁷ *Ibid.*, 1974, pp. 99-106.

⁸ *Ibid.*, 1976, pp. 520-525.

The Consultative Committee would ensure the performance of these tasks.

2. *Complaints and investigations*

Draft of the socialist countries: article VI;

Draft of Japan: articles VIII, IX, X;

Draft of the United Kingdom: articles IX and X.

The socialist countries' draft provides (article VI) that a State Party which finds that there has been a breach of the provisions of the Convention may lodge a complaint with the Security Council. The other States are required to assist in carrying out any investigation decided upon by the Security Council on the basis of that complaint.

The Japanese draft envisages a different procedure: a State which suspects that there has been a breach of the Convention may request an explanation, directly or through the International Verification Agency, and the Agency itself may take the initiative of requesting explanations. The suspected State co-operates *in good faith*: it may request an inquiry or an inspection to remove suspicion.

Only when the explanations requested are found to be inadequate will the International Verification Agency request an inspection which the suspected State *shall make every effort* to accept, *unless it gives valid reasons* for refusing such inspection.

The United Kingdom draft (article X) provides in the first part for a procedure similar to that of the Japanese draft: request for an explanation in the event of a breach, but also request for an investigation with an on-site inspection to be carried out by the Consultative Committee, which *must* be accepted by the suspected State. A complaint may also be lodged with the Security Council.

* * *

In conclusion, control of the non-production of chemical warfare agents raises two problems: monitoring and verification.

While a number of monitoring procedures have been proposed, there are two contrasting approaches in the matter of verification. One is that only on-site inspection under international supervision can permit effective verification of the non-production of chemical agents; this approach is reflected in the draft convention proposed by the United Kingdom. The other approach rejects this procedure and emphasizes national means of verification, international intervention being limited to the application of monitoring procedures whose reliability is open to question: the socialist countries have submitted a draft along these lines.

In the view of the French delegation, the first monitoring procedure to be developed should be statistical data analysis. It applies both to single-purpose and dual-purpose agents. Effectiveness requires that each of the Convention's signatory countries should undertake to supply the following information:

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Nature, quantity and utilization of organophosphorus compounds, raw materials and intermediates used in their production, and precursors of such chemical warfare agents;

Nature, quantity and utilization of dual-purpose chemical agents produced;

Proposed activities of newly constructed chemical factories.

The signatory countries should also undertake to submit periodic reports on their compliance with the provisions of the Convention, and these reports should be approved and transmitted at the governmental level.

Remote-detection monitoring procedures do not seem capable of providing information on the nature of the products manufactured.

As to the problems raised by verification, it must be acknowledged that only on-site inspection of an international character, possibly accompanied by the taking of samples, can afford fully adequate guarantees. Such arrangements are considered essential both for systematic verification and for a check resulting from a challenge procedure. If non-technical conditions were to lead to the acceptance of an agreement providing for national verification, such verification should at least be accompanied by international procedures for the monitoring of declared sites for the production of single-purpose and dual purpose chemicals. The procedures introduced should permit both verification of the non-reactivation of "mothballed" factories and monitoring of the environment of operating factories. Observation satellites might be suitable for the former purpose and periodically read "black boxes" for the latter.

In all cases of a breach or a request for an inquiry, on-site inspection by an international body should be accepted by the suspected State.

The establishment of an international body—for instance, a Consultative Committee—is therefore essential.

The problems raised by "binary" weapons have not been dealt with. They warrant special study and examination of an extremely comprehensive nature.

Interview of Secretary of Defense Brown: Possibility of Nuclear Escalation [Extract], July 1, 1980¹

Q. Don't you fear that with the development and preparation of tactical arms you might lose control of a conflict?

A. The existence of tactical nuclear weapons does indeed provide something that could be called a powder train which makes it at least possible and perhaps likely that in a geographical area that was of overwhelming importance to both sides, even a small attack would

¹ ACDA files. The interview, given to Thierry de Scitivaux of TF-1 in Paris, was transmitted over French television on July 2, 1980.